

Remarks

Reconsideration and withdrawal of the objections and rejections set forth in the above-mentioned Official Action in view of the foregoing amendments and the following remarks are respectfully requested.

Claims 1 and 3-13 are now pending in the application, with Claims 1 and 13 being independent. Claims 2 and 14 have been cancelled without prejudice. Claims 1 and 3-13 have been amended herein.

Initially, Applicants request that the Examiner consider the documents cited in the Information Disclosure Statement filed November 10, 2004, and indicate such consideration by initialing and returning a copy of the Form PTO-1449 provided therewith. A copy of the Form PTO-1449 is provided herewith for the Examiner's convenience.

The drawings were objected to for including reference numerals "32" and "28" in Figs. 1 and 2, respectively, which reference numerals were not discussed in the specification. In response, in the accompanying Letter Transmitting Corrected Formal Drawings, reference number "32" has been deleted from Fig. 1 and "28" has been corrected to --20-- in Fig. 2. The drawings were also objected to for not including reference character "S916", which is mentioned at page 27, line 1 of the specification. As a correctly noted by the Examiner, "S916" should read --S906--, and the specification has been so corrected herein. Reconsideration and withdrawal of the objections to the drawings are requested.

The specification and Claims 4 and 6-10 were objected to for minor informalities. Applicants have amended the pertinent portions of the specification and

these claims in the manner suggested by the Examiner. Reconsideration and withdrawal of these objections are requested.

Applicants note with appreciation the indication that Claims 6-10 recite allowable subject matter. These claims were objected to for being dependent upon rejected base claims. However, these claims will not be rewritten in independent form at this time because their respective independent claims are believed to be allowable for the reasons discussed below.

Claims 1, 4, 5 and 13 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,459,496 (Hanabusa et al.). Claims 1-4 and 11-14 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,234,604 (Kawakami et al.) in view of U.S. Patent No. 4,970,534 (Terasawa et al.). These rejections are respectfully traversed.

As is recited in independent Claim 1, the present invention relates to an inkjet recording apparatus for executing recording by ejecting ink onto a recording medium based on recording data using a recording head for ejecting the ink from ejection ports. The apparatus includes recovery means, a cap member, capping means, measurement means and control means. The recovery means executes recovery processing for maintaining the ink ejection capability of the recording head. The cap member caps the ejection ports of the recording head. The capping means moves the cap member in a direction in which the cap member approaches the recording head and in a direction in which the cap member is separated from the recording head. The measurement means measures a cap-open period that is an elapsed period of a cap-open state while recording

onto the recording medium, in which the ejection ports are not capped with the cap member. The control means executes the recovery processing by the recovery means when the cap-open period cumulated by cumulation means exceeds a predetermined period. The control means resets the cumulated period when the recovery processing is executed while the cap-open period is cumulated.

As is recited in independent Claim 13, the present invention relates to a recovery control method in an inkjet recording apparatus that executes recording by ejecting ink onto a recording medium based on recording data using a recording head for ejecting the ink from ejection ports, and comprises recovery means for executing recovery processing for maintaining the ink ejection capability of the recording head, a cap member for capping the ejection ports of the recording head, and capping means for moving the cap member in a direction in which the cap member approaches the recording head and in a direction in which the cap member is separated from the recording head. The recovery control method includes the steps of measuring a cap-open period that is an elapsed period of a cap-open state while recording onto the recording medium, in which the ejection ports are not capped by the cap member, executing the recovery processing by the recovery means when the cap-open period cumulated by cumulation means exceeds a predetermined period and resetting the cumulated period when the recovery processing is executed while the cap-open period is cumulated.

With the above arrangement and method, a proper discharging state of the nozzles of the ink jet head can be maintained regardless of printing conditions. For example, in a recording head having nozzle arrays of plural colors, when the head is

uncapped and only the black nozzles are used in recording, because such would tend to destabilize the dischargeability of the color arrays, recovery processing can be executed appropriately.

Hanabusa et al. relates to an electronic typewriter having an ink jet printer. In Fig. 23A, a timer is used to determine whether T seconds have passed after a cap was opened. In step S207, preliminary ejections are carried out a predetermined number of times. However, the flowchart of Fig. 23A is directed to a control procedure of a position designating mode. That is, this figure depicts a process of designating a recording position in a recording mode for recording with designation of the recording position by a user. While the recording position is designated, a cap is caused to be opened. To counteract this disadvantage, preliminary ejection is performed during the designation of the recording position.

Therefore, Hanabusa et al. does not disclose or suggest measuring a cap-open period that is an elapsed period of a cap-open state while recording onto a recording medium, as is recited in independent Claims 1 and 13.

Thus, Hanabusa et al. fails to disclose or suggest important features of the present invention recited in independent Claims 1 and 13.

Kawakami et al. relates to an ink jet recording apparatus that includes a timer for measuring from release from a cap member after a print command has been outputted and a flushing controller, responsive to a signal from the timer, for moving the recording heads to an ink receiver and resetting the timer. As understood by Applicants, in Kawakami et al. (1) the recovery is executed when an elapsed time period for which the

recording heads have been released from the capping device reaches 30 minutes, (2) the time period as measured is reset upon the end of printing operations, and (3) a flushing operation, which is designed to jet ink droplets to the capping device or to an ink receiving member, is performed at a short cycle, e.g., a cycle of 20 seconds. That is, when the capping device is opened for a period longer than that of the flushing operation, recovery is executed. Even when the flushing operation is executed at a relatively shorter cycle, the time period as measured is not reset, but is only reset upon the end of the recording operations.

Regarding Claims 2 and 14, which have been incorporated into independent Claims 1 and 13, respectively, the Examiner refers to step f of Fig. 6 of Kawakami et al. However, in step f, timer 26, which controls the flushing operation executed based on a time period elapsed after a printing operation has been started, is reset. Applicants respectfully submit that an elapsed time of an un-capped period described at col. 4, lines 37-46 is not reset by the execution of the flushing operation. Accordingly, Kawakami et al. fails to disclose or suggest at least resetting a cumulated period when a recovery processing is executed while a cap-open period is cumulated, as is recited in independent Claims 1 and 13.

Thus, Kawakami et al. also fails to disclose or suggest important features of the present invention recited in independent Claims 1 and 13.

Terasawa et al. was cited by the Examiner for teaching capping means for moving a cap member in directions toward and away from a recording head. However,

Terasawa et al. is not believed to remedy the deficiencies of Kawakami et al. noted above with respect to independent Claims 1 and 13.

Thus, independent Claims 1 and 13 are patentable over the citations of record. Reconsideration and withdrawal of the §§ 102 and 103 rejections are respectfully requested.

For the foregoing reasons, Applicants respectfully submit that the present invention is patentably defined by independent Claims 1 and 13. Dependent Claims 3-12 are also allowable, in their own right, for defining features of the present invention in addition to those recited in independent Claim 1. Individual consideration of the dependent claims is requested.

Applicants submit that the present application is in condition for allowance. Favorable reconsideration, withdrawal of the objections and rejections set forth in the above-noted Office Action, and an early Notice of Allowability are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark Williamson", written over a horizontal line.

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